

## **Steller Sea Lion Research Initiative Standardized Interim Progress Report**

### **A. Project Identifiers**

1. Award number NA16fX1419
2. Grant Program/ CFDA # 11.439
3. Recipient Organization: University of Alaska Fairbanks
4. Principal Investigator: Mary F. Willson
5. Project Title: GEOGRAPHICAL ECOLOGY OF STELLER SEA LIONS AND EPHEMERAL HIGH-QUALITY PREY SPECIES IN SOUTHEASTERN ALASKA
6. Funding: Federal: \$136,575; Match: \$0
7. Award Period Start Date: 1 June 2001 End Date: 31 May 2003
8. Report Start Date: 1 Jan 2002 Report End Date: 31 May 2002

### **B. Project Summary**

The underlying working hypothesis (for this project and a companion project under Glenn VanBlaricom) is that sea lion reproductive success is influenced by food resources, perhaps especially in spring when sea lions are preparing to go to the rookeries located along the outer coast of southeastern Alaska. This project is testing one prediction of that underlying hypothesis: the spatial and temporal distribution of sea lions in spring is closely related to the distribution of forage-fish spawning runs.

The spatial and temporal distribution of Steller sea lion in Southeast Alaska in spring is being mapped with respect to the location of spring spawning runs of forage fishes, particularly eulachon and herring. These spawning runs provide an ephemeral but abundant and very high-quality source of food, and sea lions in southeastern Alaska are known to forage intensively at some of these spawning runs in spring. This project addresses the proposition that these forage-fish runs are important to sea lions throughout the region, as reflected by their spatial and temporal distribution.

### **C. Summary of Progress and Results**

#### **1. Scheduled Tasks**

##### **Task 1: Map (GIS)**

The locations of Steller sea lion haulouts and of spawning runs of eulachon and herring were collected, incorporated into a GIS database and mapped.

Task2: Intensive spring aerial surveys from March to May 2002 to document spatial and temporal distribution of sea lions during spawning runs and to document distributional responses of Steller sea lions to prey aggregations.

## 2. Activities Undertaken

Task1: We have continued to update and refine the GIS map of seasonal use of Steller sea lion haulouts and herring and eulachon spawning sites. Seasonality of Steller sea lion haulouts was determined by examining monthly aerial survey data of Steller sea lions haulouts that was collected from April 2001-April 2002 by Jamie Womble, a graduate student at the University of Alaska Fairbanks, in cooperation with Dr. Michael Sigler at the NMFS-Auke Bay Laboratory.

Task2: Jamie Womble (UAF graduate student) conducted spring intensive aerial surveys of Steller sea lions at haulouts and of Steller sea lions at herring and eulachon spawning sites from March 21, 2002 through May 15, 2002 from a fixed-wing aircraft. We conducted aerial surveys approximately every 10 days with a total of 5 surveys in the main study area in northern Southeast Alaska. In addition, we also conducted aerial surveys in Craig, Sitka Sound, Ketchikan, and Stikine River area to attempt to locate and document seasonal use of haulouts by sea lions and sea lion aggregations at herring and eulachon spawning sites.

Womble and field assistant have processed the photographic images from the spring 2002 aerial surveys. The data of numbers of sea lions at forage fish spawning runs have been entered into a database and we are beginning preliminary data analysis.

## 3. Changes to Goals and Objectives

### A. Change in Survey Altitude

Due to a delay in the NMFS-Office of Protected Resources permitting process, we were unable to conduct the spring 2002 aerial surveys at the standard survey altitude of 600-700 feet. After consulting with the Peter Jones, Barbara Fosberg, and Shawn Carey of the NMFS-Alaska Region Office, who in turn consulted with Tammy Adams at NMFS-Office of Protected Resources, we were granted permission to conduct the aerial surveys above 1000 feet. As a result of increased survey altitude it was necessary to use a digital camera (Nikon D1X) equipped with a longer telephoto lens (80-300) in order to obtain images that were suitable for counting sea lions from photographic images taken at 1010 feet.

### B. Study Area

Initially our objectives were to conduct aerial surveys during spring 2002 throughout southeastern Alaska at Steller sea lion haulouts and herring and eulachon aggregations. However, due to the time restrictions, concurrent spawning runs in widely separated locations, personnel requirements, and large geographic area to be covered, we deemed it difficult to survey all of southeastern Alaska. Therefore we focused our intensive aerial surveys efforts in northern Southeast Alaska where NMFS is currently conducting

year-round monthly aerial survey of Steller sea lions. These monthly aerial surveys provide necessary baseline data for this study to determine the seasonal use of haulouts by Steller sea lions. In other areas of southeastern Alaska (Dixon Entrance to Frederick Sound) past aerial surveys have only been conducted during the breeding season (June-July); therefore there is little if any information with respect to seasonal haulout use by Steller sea lions. As a result of this reduction in size of our study area, we conducted more frequent aerial surveys of our study area to provide a more detailed description of the distribution of Steller sea lions in spring with respect to herring and eulachon spawning sites. A total of five full surveys were conducted from March 21, 2002 through May 15, 2002 (Table 1). In addition, we conducted single aerial surveys at selected sites in southern Southeast Alaska (Table 3). These areas were selected due to the presence of known herring and eulachon spawning sites and we conducted aerial surveys to determine the sea lion response at these sites.

#### 4. Results

A. GIS Map of Steller Sea Lion Haulouts and Herring and Eulachon Spawning Sites in southeastern Alaska (Figure 1).

B. Preliminary Results from Spring 2002 Aerial Surveys:

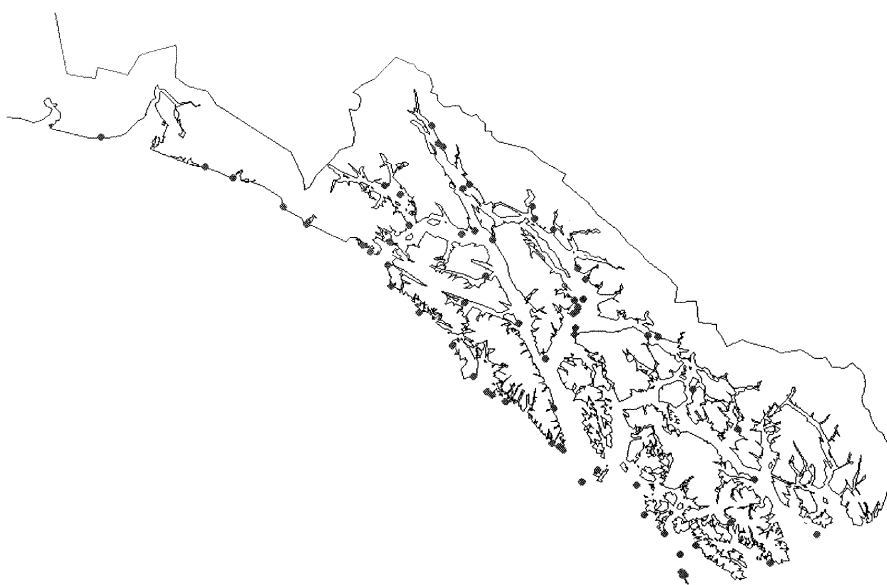
Steller sea lion haulouts occupied in spring are closer to spawning runs than haulouts that are occupied during the winter-spring and year-round seasons (Figure 2). In addition, some sea lion haulouts (at the Alsek River mouth, Berners Bay, and Dorothy) are only occupied in spring when forage fish are spawning nearby. Numbers of sea lions at Gran Point (Figure 3), a sea lion haulout in upper Lynn Canal, increased dramatically in April and May, presumably in response to aggregations of forage fish.

Aerial survey results indicate that some herring and eulachon aggregations are visited by several hundred sea lions whereas other spawning sites appear not to be used by sea lions (Table 2). Factors that may determine whether or not a spawning site is attended by sea lions in spring include distance to nearest haulout and biomass and distribution of fish at the spawning site. In addition, aerial survey intervals of ten days may not be frequent enough to detect all spawning aggregations.

#### 5. Problems

None prevented task completion.

A. Steller sea lion haulouts in southeastern Alaska.



B. Spawning sites of Pacific Herring and Eulachon in southeastern Alaska.

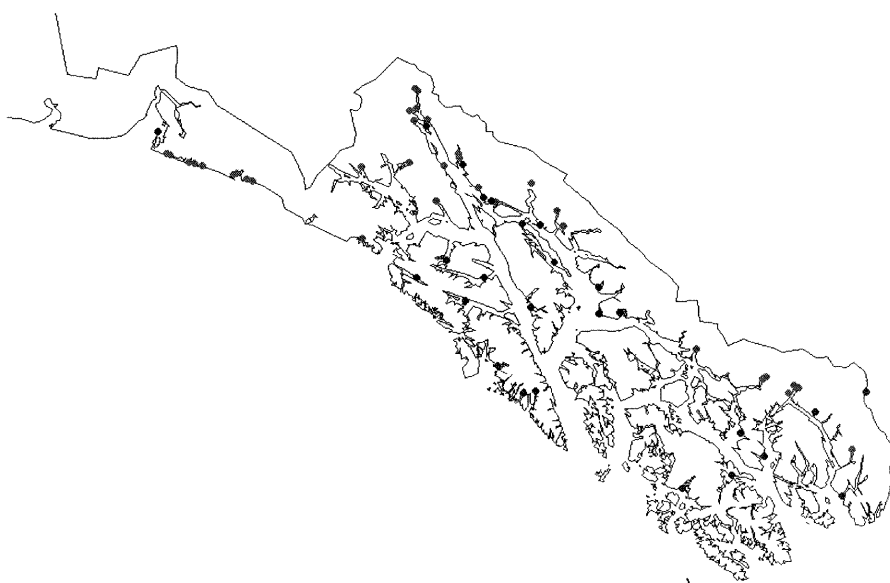


Figure 1. Locations of Steller sea lion haulouts (A), Pacific herring (blue), and eulachon (red) spawning sites (B) in southeastern Alaska.

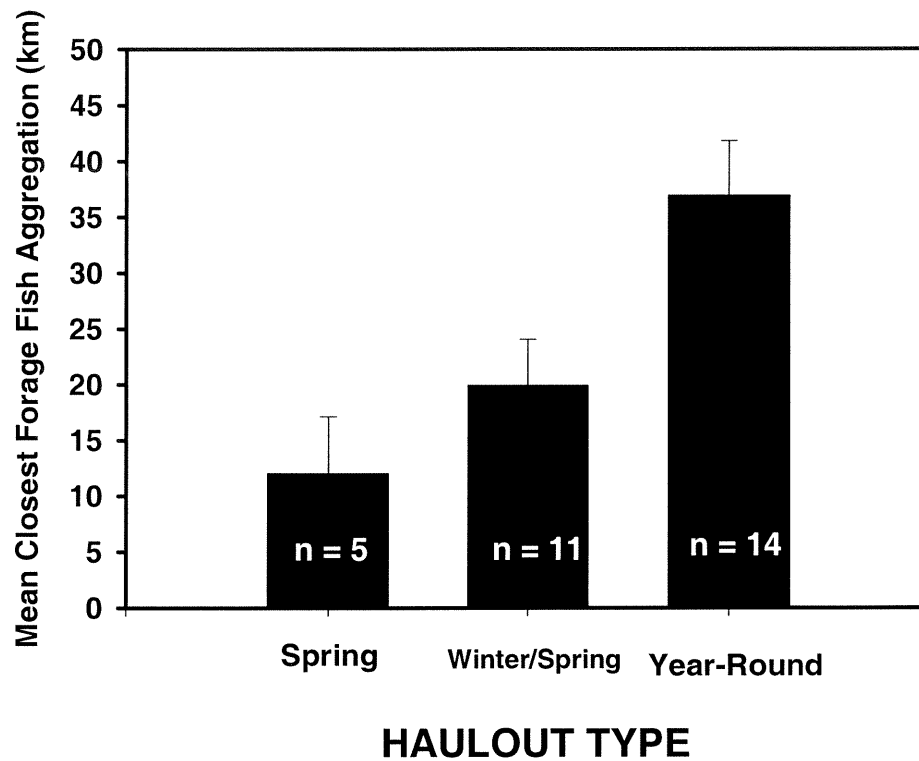


Figure 2. Steller sea lion haulouts types in relation to the mean closest forage fish aggregation. Sea lion haulout types (spring, winter-spring, and year-round) were determined using data from monthly aerial surveys of Steller sea lions.

Table 1. Spring 2002 Steller sea lion aerial survey dates and locations.

SURVEY #	SURVEY DATE	AREA
1	March 21-22, 2002	LC/GLBA/IS, SP/FS/CS
2	April 8-10, 2002	LC/GLBA/IS, SP/FS/CS
3	April 18-19, 23, 2002	LC/GLBA/IS, SP/FS/CS
4	April 29, May 1, 3, 2002	LC/GLBA/IS, SP/FS/CS
5	May 14-15, 2002	LC/GLBA/IS, SP/FS/CS
	March 24, 2002	Ketchikan
	March 26, 28, 2002	Sitka Sound
	March 29 and April 2, 2002	Stikine River
	April 2, 2002	Craig

**LC/GLBA/IS** = Lynn Canal/Glacier Bay/Icy Strait

**SP/FS/CS** = Stephens Passage/Chatham Strait/Frederick Sound

Table 2. Peak counts of Steller sea lions in water detected from aerial surveys at spring-spawning aggregations of herring and eulachon in southeastern Alaska.

SPAWNING LOCATION	FISH SPECIES	PEAK SEA LION COUNT	DATE
Berners Bay	Eulachon	949	April 18, 2002
Lutak Inlet	Eulachon	506	April 29, 2002
Taku Inlet	Eulachon	235	April 10, 2002
Katzehin River	Eulachon	61	April 8, 2002
Adams Inlet	Eulachon	37	April 18, 2002
Speel River	Eulachon	36	April 9, 2002
Excursion River	Eulachon	31	April 9, 2002
Chilkat Inlet	Eulachon	24	April 29, 2002
Ferebee River	Eulachon	20	April 18, 2002
Dixon River	Eulachon	8	April 8, 2002
Harding River	Eulachon	16	March 24, 2002
Bradfield River	Eulachon	6	March 24, 2002
Taiya River	Eulachon	4	April 29, 2002
Queen Inlet	Eulachon	3	April 8, 2002
Skagway River	Eulachon	2	April 29, 2002
Endicott River	Eulachon	1	April 29, 2002
Eagle River	Eulachon	0	Not attended
Mendenhall River	Eulachon	0	Not attended
Seymour Canal	Herring	221	May 3, 2002
Tenakee Inlet	Herring	105	April 9, 2002
Hobart Bay/Port Houghton	Herring	87	May 1, 2002
Emmons Island	Herring	68	April 23, 2002
Mud (Flat) Bay	Herring	0	Not attended
Port Frederick	Herring	0	Not attended

Table 3. Aerial surveys conducted at known herring and eulachon spawning sites in southern Southeast Alaska and the number of sea lions at each site. \*Flights conducted when notified that run had begun, therefore these are not necessarily peak counts. Other sites surveyed on same dates, but without local information on run timing.

SPAWNING LOCATION	FISH SPECIES	SEA LION COUNT	DATE
Whiting River	Eulachon	0	March 24, 2002
Unuk River*	Eulachon	0	March 24, 2002
Klehini River	Eulachon	0	March 24, 2002
Chickamin River	Eulachon	0	March 24, 2002
Wilson/Blossom River	Eulachon	0	March 24, 2002
Stikine River*	Eulachon	4	March 29, 2002
Craig*	Herring	288	April 2, 2002
Sitka Sound*	Herring	237	March 28, 2002
Annette Island*	Herring	75	March 24, 2002
Point Higgins*	Herring	40	March 24, 2002
Kasaan*	Herring	22	April 2, 2002
Kah Shakes/Cat Island	Herring	0	March 24, 2002
Betton Island	Herring	0	April 2, 2002
Vixen Inlet	Herring	0	March 24, 2002
Betton Island	Herring	0	April 3, 2002



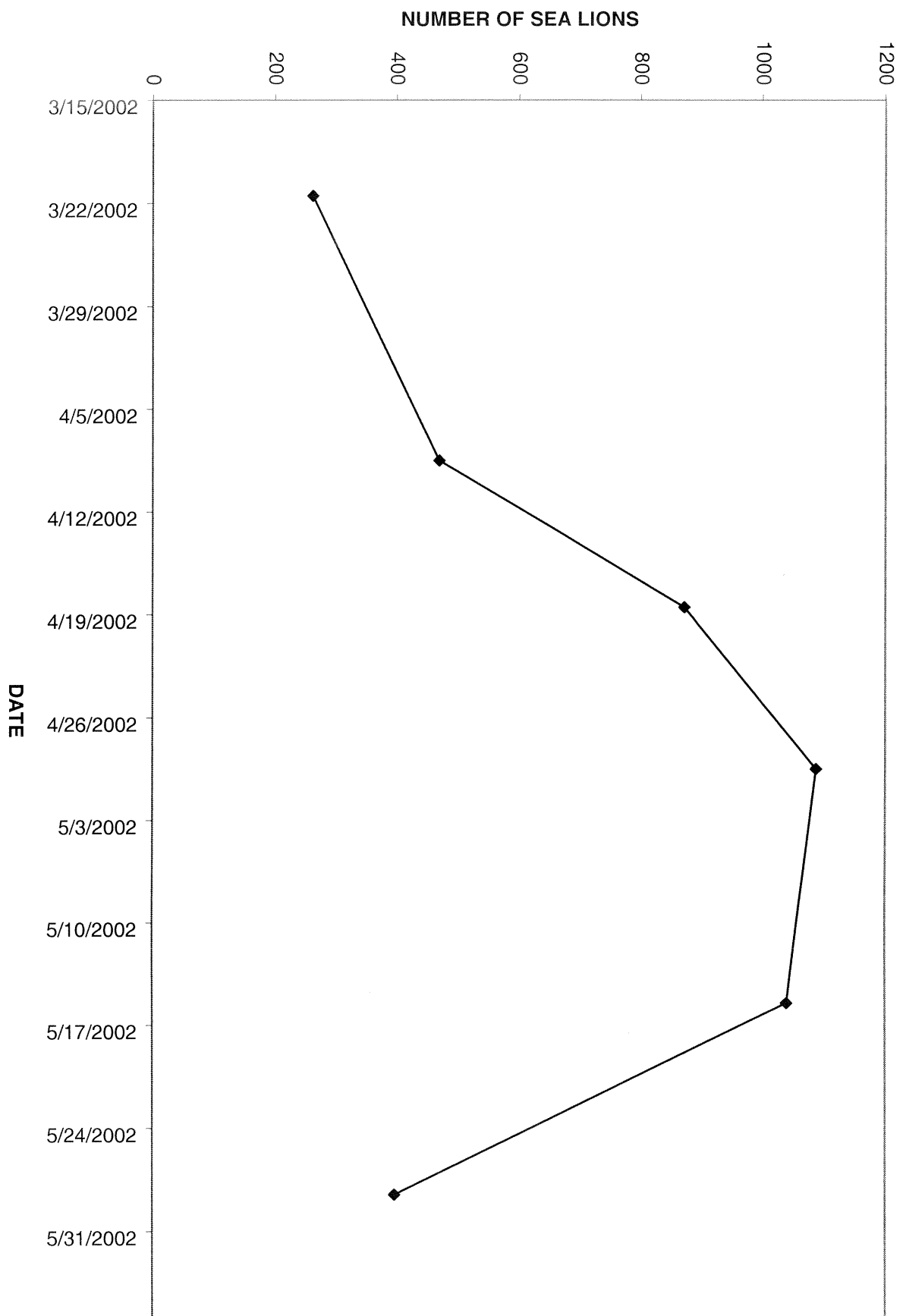


Figure 3. Number of Steller sea lions at Gran Point, a sea lion haulout in upper Lynn Canal, during spring 2002.